



United States
Environmental Protection
Agency

National Risk Management Research Laboratory

*Providing
Solutions for a
Better Tomorrow*



Mission

As part of the U.S. Environmental Protection Agency's Office of Research and Development, the National Risk Management Research Laboratory (NRMRL) conducts research into ways to prevent and reduce pollution risks that threaten human health and the environment. The laboratory investigates methods to prevent and control pollution of air, land, and water, and to restore ecosystems. The goals of this research are to:

- (1) develop and promote technologies that protect and improve the environment;
- (2) develop scientific and engineering information to support regulatory and policy decisions; and
- (3) provide technical support and information transfer to ensure implementation of environmental regulations and strategies at the national and community levels.

In addition, NRMRL collaborates with both public and private sector partners to anticipate emerging problems and to foster technologies that reduce the cost of compliance.

Research

NRMRL has research facilities at its headquarters in Cincinnati, Ohio, and at its locations in Research Triangle Park, North Carolina; Ada, Oklahoma; and Edison, New Jersey. NRMRL's staff includes several hundred scientists and engineers devoted to solving a wide range of environmental problems. Information follows about NRMRL's seven key research areas that support EPA's mission.

Drinking Water Protection

The U.S. has one of the safest public drinking water supplies in the world. However, current and future challenges — like the emergence of new waterborne diseases, varying source water quality, and increased contamination of ground water — must be met with well-focused research activities. NRMRL's researchers develop, investigate and improve ways to: (1) remove contaminants such as disease-causing microorganisms and arsenic from source water, and (2) reduce sediment content and disinfection byproducts in treatment and distribution systems. By responding to calls for technical assistance at sites of waterborne disease outbreaks, NRMRL researchers help mitigate the outbreaks while gaining insight into the need for new or modified treatment technologies. Innovative small-system technologies such as ultrafiltration membranes and onsite disinfectant generation are being evaluated for their capability to remove or inactivate pathogens such as *Cryptosporidium*.

Air Pollution Control

To reduce air pollutant effects on human health and the environment, NRMRL researchers develop, refine, and demonstrate cost-effective air

pollution prevention and control technologies. These research products reduce emissions from manufacturing and processing industries, power plants, and incinerators; help improve the quality of indoor environments; and provide a better understanding of the sources of greenhouse gases. NRMRL is focusing its air pollution control research on reducing the quantity and toxicity of emitted air pollutants. For example, by investigating the formation mechanisms of fine particulate matter, NRMRL researchers may be able to modify combustion processes to reduce particulate matter toxicity. NRMRL's research on mercury emissions is providing decision makers with improved data on cost and performance of control technologies and prevention options.

Pollution Prevention and Sustainability

Research at NRMRL helps to develop and demonstrate pollution prevention and recycling approaches as well as resource recovery and reuse technologies. NRMRL research includes “green chemistry” projects where investigators are exploring the substitution of cost-effective, ecologically-friendly processes for traditional chemical processes. NRMRL engineers continue to design and refine software that enables manufacturers to make process changes that can improve environmental performance. One such software tool works in concert with commercial process simulators to enable design of processes and solvent mixtures with the least adverse environmental impact. Membrane and adsorption processes are also being studied by NRMRL researchers to improve recovery of reusable chemicals and metals from manufacturing waste streams.

From pollution prevention research, sustainability and sustainable development have evolved in NRMRL as new research topics in their own

Cincinnati, Ohio

- Land Remediation & Pollution Control Division
 - Sustainable Technology Division
 - Technology Transfer & Support Division
- Water Supply & Water Resources Division
 - Technology Coordination Staff
 - Resource Operations Staff

Edison, New Jersey

- Urban Watershed Management Branch

Ada, Oklahoma

- Ground Water & Ecosystems Restoration Division

Research Triangle Park, North Carolina

- Air Pollution Prevention & Control Division



right. Sustainability is the planning and use of resources in communities so that they will be available at equal or greater levels for future generations. Sustainable development is the approach that a community chooses to implement in an effort to remain sustainable. NRMRL researchers are studying and developing tools that facilitate sustainability; beyond this, they are evaluating the benefits such tools provide if applied through community-based environmental protection programs. Pollution prevention solutions, including material and energy efficient technologies viewed from a life cycle perspective (i.e., resource use and environmental impacts of the entire life span of a product), will be essential to meeting sustainable development goals. A full understanding of potential environmental impacts can help local decision makers and stakeholders plan for cost-effective yet resource-efficient approaches to community projects.

Contaminated Media Remediation

To help clean up the more than one thousand hazardous waste sites that are currently on the National Priorities List, as well as leaking underground storage tanks, oil spills and sediments, NRMRL is developing tools and technologies to understand and remediate contaminants. For example, NRMRL researchers are developing models to assess the fate, transport, and transformation rates of contaminants in soil and ground water. NRMRL scientists and engineers are also demonstrating methods for containment and remediation of contaminants from these sites. Biological methods being investigated include the use of microorganisms and plants to degrade or take up contaminants in soils and ground water. Chemical methods include the use of additives to bind with and reduce the danger of metals in soil. Chemical methods are being combined with physical methods to treat and control contaminants in soil, sediments and ground water. NRMRL researchers are also evaluating how natural attenuation – the use of natural processes to break down or capture contaminants – can be combined with intensive monitoring to provide cost-effective site clean-up that meets regulatory requirements.

Watershed Management and Restoration

Watersheds are large-scale natural drainage areas that generally include lakes, rivers, wetlands, and other water bodies and the surrounding landscape. Watershed-scale problems often entail combined impacts to land, water, and air resources; protecting these resources requires a coordinated effort, based on sound science, by many scientists, engineers, and involved stakeholders. Recognizing the multifaceted nature of watershed problems, NRMRL scientists and engineers are using a holistic approach that draws upon many programs to carry out watershed research and develop best management practices. Such practices include pollution prevention and control, onsite sediment remediation technologies, urban storm water management approaches, and combined sewer overflow treatment and control systems. Computer models and decision support systems are being developed by NRMRL to assist watershed managers and communities with ecosystem management and restoration projects.

Environmental Technology Verification (ETV)

The goal of the Environmental Technology Verification (ETV) Program is to provide credible performance data for commercial-ready environmental technologies to aid vendors in selling innovative technologies, and to help purchasers and permittees make decisions regarding environmental technologies. The ETV Program is carried out through partnerships with private testing and evaluation organizations. These ETV partners work with EPA and other technology experts to create efficient and quality-assured testing procedures that verify the performance of innovative technologies. ETV was established in 1995 and completed its five-year pilot period in 2000. Lessons learned in the pilot period are being incorporated into six operating ETV centers which cover technology verifications for a wide spectrum of environmental technologies. Topical areas include: drinking water treatment; air pollution control; advanced monitoring systems; water quality protection; greenhouse gas mitigation; and pollution prevention, recycling, and waste treatment. The efforts of the ETV centers are being guided by the expertise of stakeholder groups which consist of private and public purchasers, permittees at local, state and federal levels, technology developers and vendors, members of environmental interest groups, and representatives of the financial community.

Technology Transfer and Technical Support

Informing the regulated community, regulatory and permitting officials, and environmental consultants about the latest advancements in risk management approaches and decision options is vital to the success of EPA's programs. NRMRL conveys this information by producing technology transfer publications, software products, brochures, and by convening technical meetings. In addition, NRMRL scientists and engineers provide expert advice and assistance to environmental managers at all levels of government. Recent outputs have included manuals on pollution prevention, onsite wastewater treatment systems, Brownfields, community-level environmental monitoring, and on specific contaminants such as mercury and arsenic. NRMRL's technical operations staff provides pilot plant support to facilitate improvement of water, wastewater, and hazardous waste treatment technologies.

NRMRL Leadership

Overall leadership and scientific direction in NRMRL are provided by:
Acting Director, Hugh W. McKinnon, M.D.

Associate Director for Health, Hugh W. McKinnon, M.D.

Associate Director for Ecology, Lee A. Mulkey

Additional Information

For additional information about NRMRL, its research programs and products, visit the NRMRL website (<http://www.epa.gov/ORD/NRMRL>) or call (513) 569-7418. NRMRL publications can be ordered by phone by calling (800) 490-9198. Technology transfer publications can be ordered online at: <http://www.epa.gov/ttbnrmrl/>

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